In-situ U–Pb geochronology and Hf isotope analyses of the Rayner Complex, east Antarctica

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In-situ zircon U–Pb and Hf isotopic analysis via laser ablation microprobe-inductively coupled plasma mass spectrometer (LAM-ICPMS) of samples from Kemp and MacRobertson Lands, east Antarctica suggests that Kemp Land evolved as a separate terrane from the rest of the Rayner Complex. Isotopic data indicate this region represents part of the Napier Complex, tectonically reworked during the Rayner Structural Episode (RSE) ca. 940-900 Ma. Recently reported ca. 1,600 Ma isotopic disturbance in rocks from the Oygarden Group may be correlated with a charnockitic intrusion in the Stillwell Hills before ca. 1,550 Ma. Rocks to the east of the Stillwell Hills represent crust accreted to a complexly deformed Archaean craton after ca. 1600 Ma. T^{Hf}_{DM} ages indicate felsic orthogneiss from Rippon Point, the Oygarden Group, Havstein Island and the Stillwell Hills share a ca. 3,660–3,560 Ma source that is indistinguishable from that previously reported for parts of the Napier Complex. More recent additions to this crust include Proterozoic charnockite in the Stillwell Hills and the vicinity of Mawson Station. These plutons have distinct $^{176}Hf/^{177}Hf$ ratios and formed via the melting of crust generated at ca. 2,150–2,550 Ma and ca. 1,790–1,870 Ma respectively. The intrusion of the Mawson Charnockite ca. 980 Ma and a probable thermal disturbance soon after crystallisation supports the initiation of the RSE in MacRobertson Land as occurring some 40-50 Myr earlier than in Kemp Land.

Reference

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